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(54) An apparatus for picking up, cutting off and optionally conveying of stalked crops, in particular maize, grown in rows

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ERRATUM

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Front page, heading (72) Inventor *delete* Wolfang Leposa *insert* Wolfgang Schremmer

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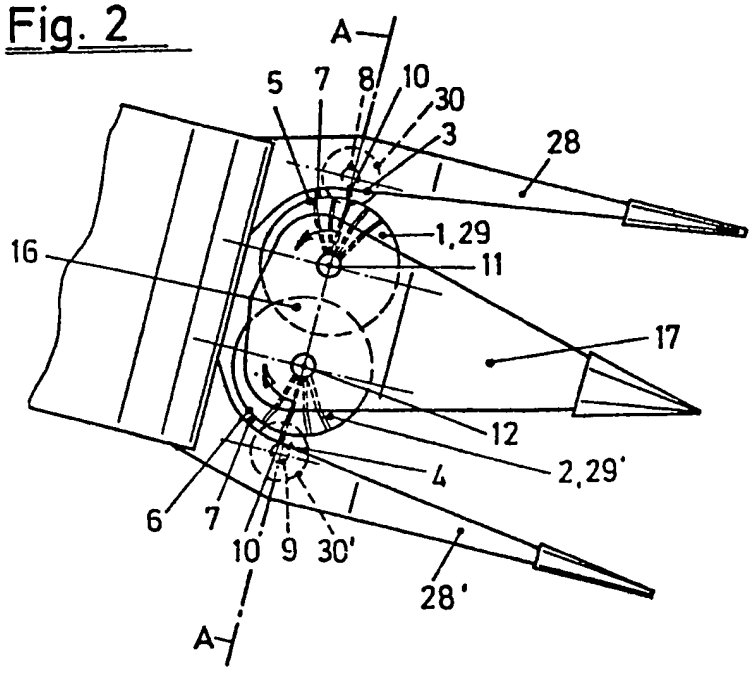
Fig. 2



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(54) **An apparatus for picking up, cutting off and optionally conveying of stalked crops, in particular maize, grown in rows**

(57) An apparatus for picking up, cutting off and conveying stalked crops, in particular maize, grown in a plurality of rows, to the infeed means of a harvesting machine such as a maize chopper, comprises two driven conveying drums 1, 2 provided on their peripheries with projections 10, guides 3, 4 and cutters 29, 29′, associated respectively with drums 1, 2, the guides being provided with respective cutters 30, 30′, and wherein the conveyor drums 1, 2 are axially staggered in relation to one another and partly overlap one another and wherein each guide 3, 4 extends over an arc subtending an angle between 60 and 90°. Arrangements are disclosed of the above construction for harvesting more than two rows of crops.

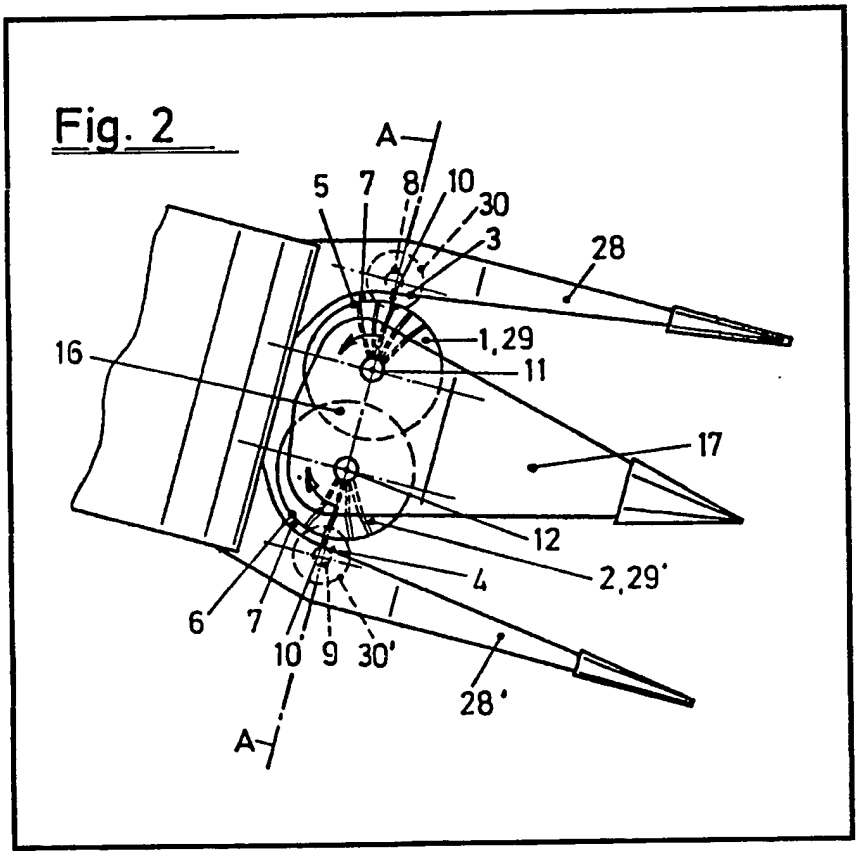

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Fig. 1

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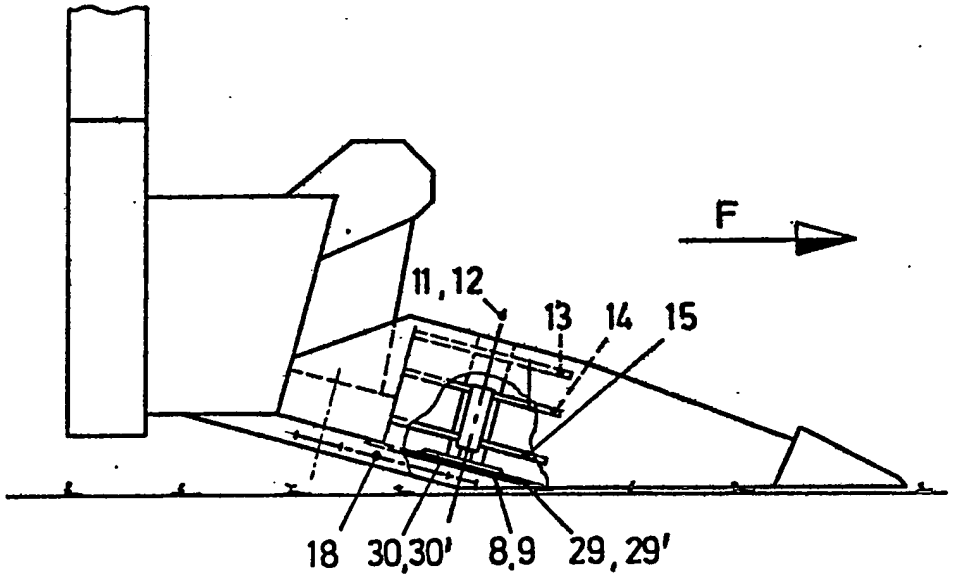

Fig. 2

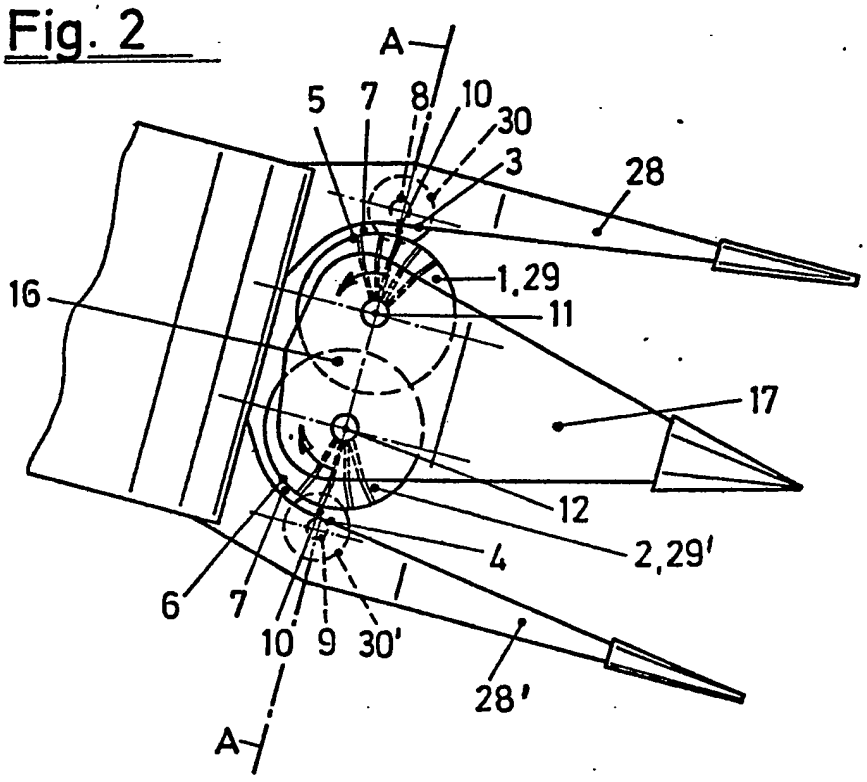

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Fig. 3

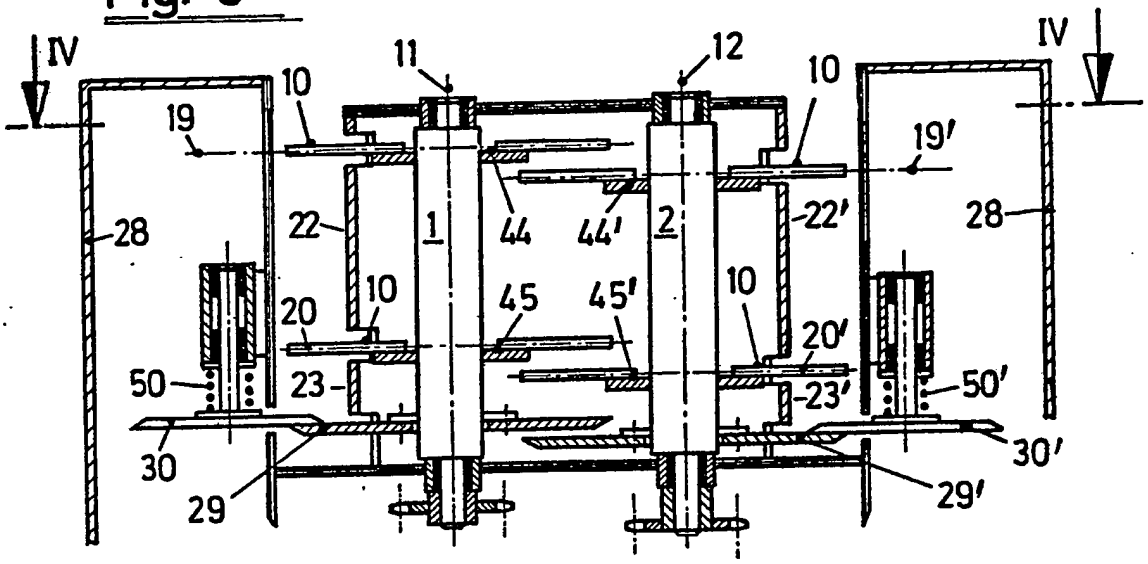

Fig. 4

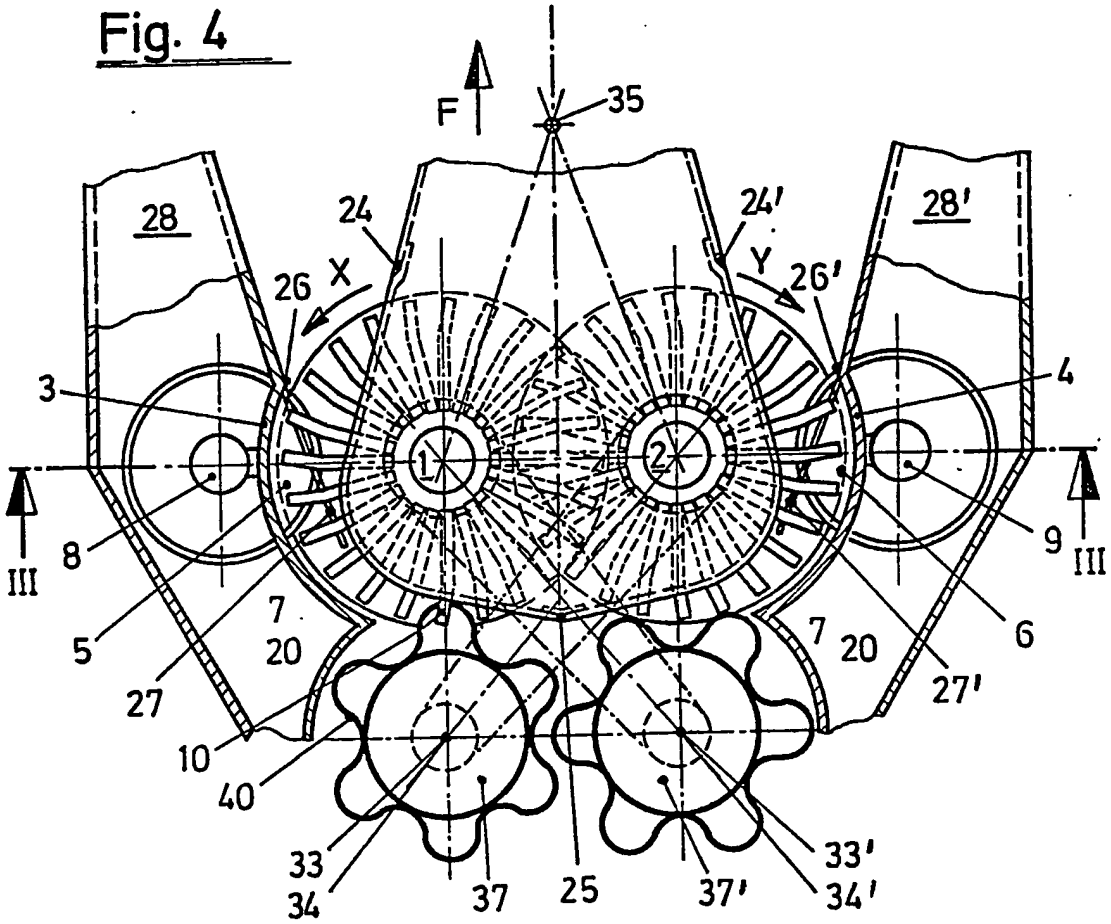

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Fig. 5

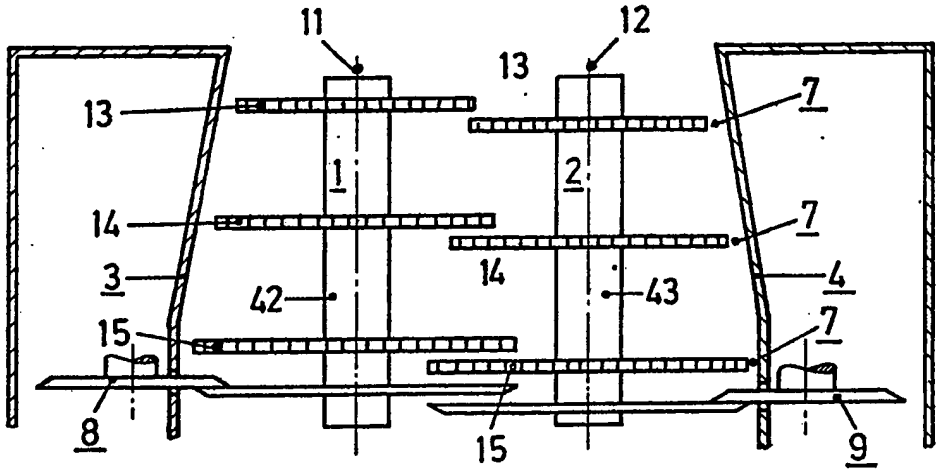

Fig. 6

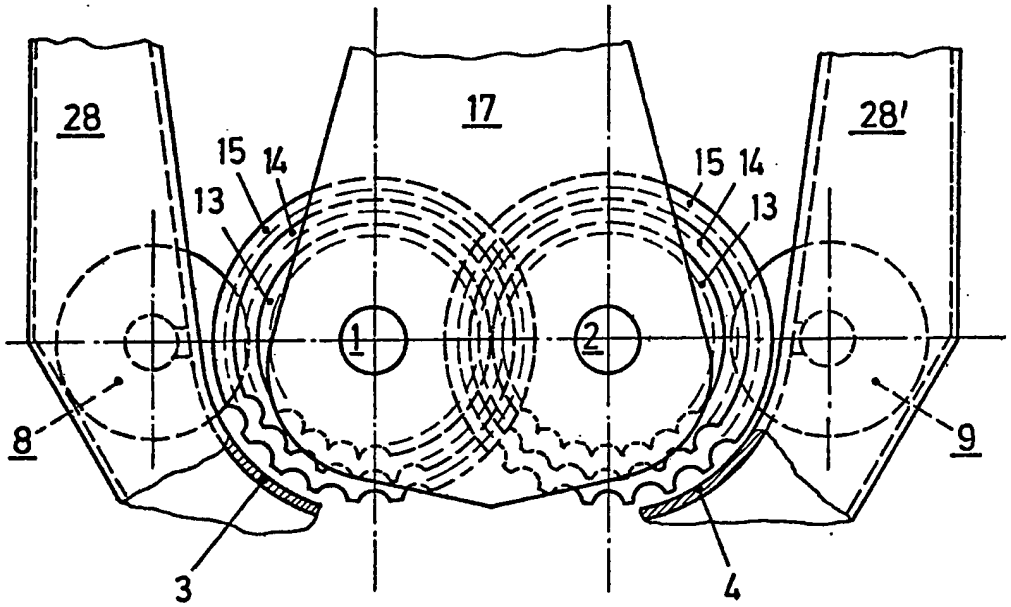

Fig. 7

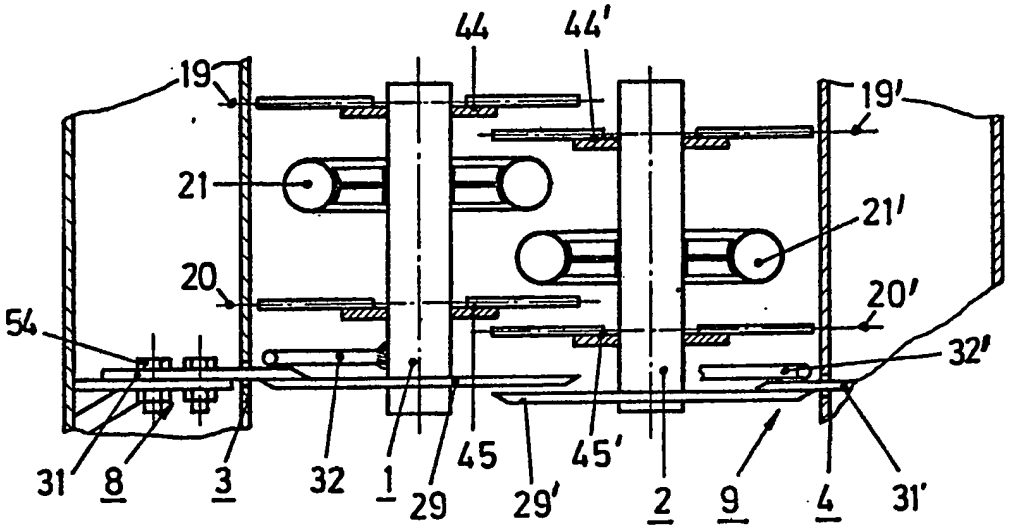
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Fig. 8

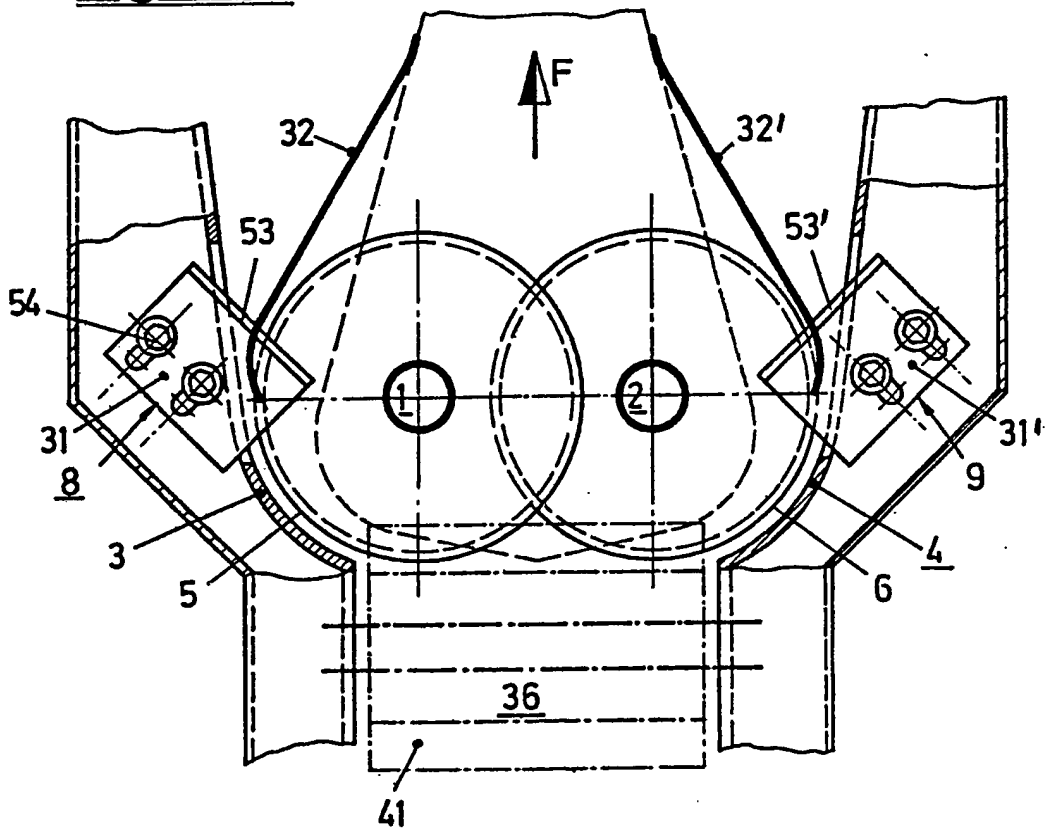
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Fig. 9

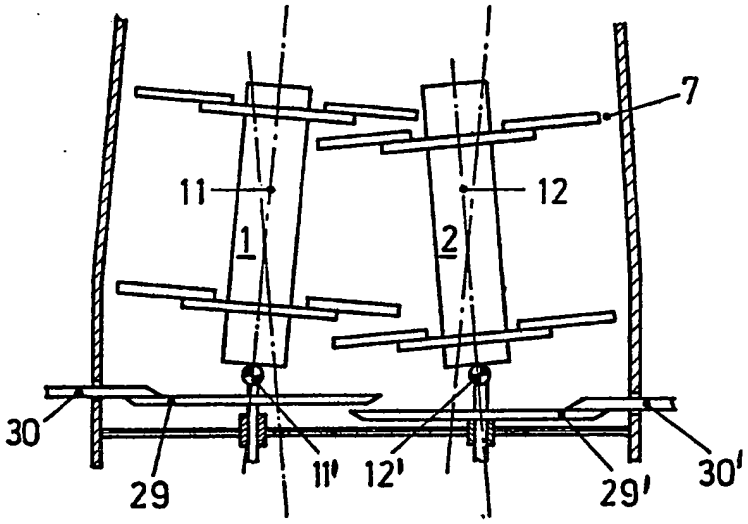
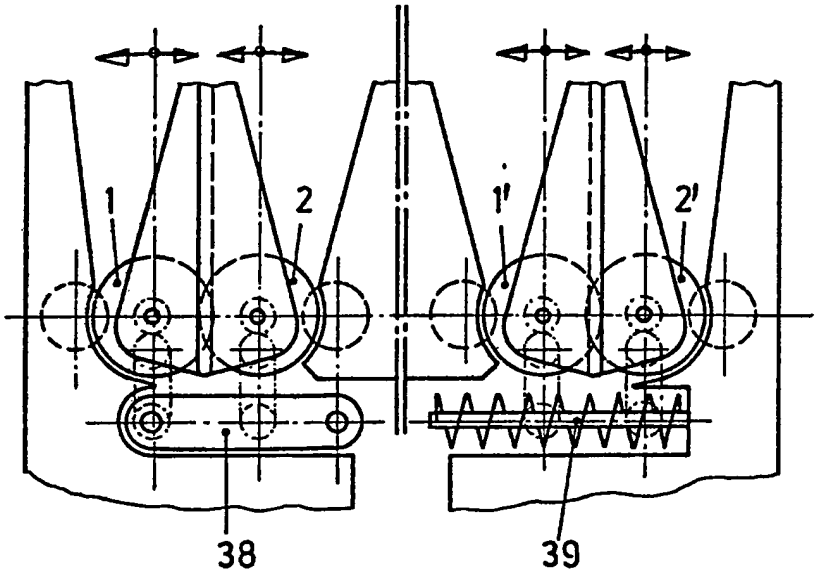


Fig. 10

Fig. 11



SPECIFICATION

An apparatus for picking up, cutting off and optionally conveying of stalked crops, in particular maize, grown in rows

The invention relates to an apparatus for picking up, cutting off and conveying of stalked crops, in particular maize, grown in a plurality of rows, to the infeed means of a harvesting machine such as a maize chopper, comprising two driven pick-up wheels of upright axes of rotation arranged side by side in driving direction and provided on their peripheries with projections, with one guide means and one cutting means associated to each pick-up wheel, said guide means being guided along a part of the periphery of the pick-up wheel at a distance which is small as compared to the diameter of the pick-up wheel and each guide means being provided with an associated cutting means in the range between guide means and pick-up wheel swept by the projections.

An apparatus for harvesting maize attachable to the cutter of a harvester combine or any other type of harvesting machine for grain is known. This apparatus grips the maize plants of one of a number of rows by means of tines arranged on the periphery of a wheel disk while they are cut off by the cutter of the harvesting machine and guides them along a guide means, with the conveying means changing from the longitudinal to the transverse direction in which the plants are conveyed to a conveyor screw positioned transversely to the driving direction of the harvesting machine. This apparatus is suitable for taking up the plants of one row only, so that the capacity of a large harvesting machine is not adequately utilised. This apparatus is driven in an elaborate and fail-prone manner by means of a belt drive across the front face of the harvesting machine and tapped from its drive. (German Auslegeschrift No. 1 226 351).

A similar apparatus, for harvesting turnip greens, is object of German Offenlegungsschrift No. 2 553 030. This apparatus consists of a drum provided on its periphery with projections and driven clockwise around an essentially upright axis, said drum preferably consisting of two chain wheels between which an elastic holding ring is attached and cooperating with a guide surface surrounding it at close distance around approximately half of its circumference, with the guide surface and circumference of the drum extending up to the inlet opening of a chopper blower.

German Utility Model No. 1 998 716 describes a pick-up apparatus having two intake belts gripping the cut-off plants and guiding them to the pre-press rolls. On the front ends, pick-up drums rotating in opposite directions around upright axes of rotation and provided on their surfaces with fingers are arranged, while on the bottom side of the drum, equal-sized and overlapping follower cutting disks rotate. This arrangement is of great length, which is a disadvantage. Two- or multiple-row pick up apparatus of this type would be very complex. The use of belts or chains is impractical because of the hazard of breakage and the accompanying, usually major damage to the harvesting machine.

Moreover, the driving speed and running speed of the belts or chains have to be adapted to one another if breakdowns, particularly those due to jamming, are to be avoided.

Further known is a number of two- or multiple-row pick-up apparatus, but these for the most part include cooperating loop belts or chains. A multiple-row pick-up apparatus for stalked crops grown in rows is described in German Offenlegungsschrift No 2 210 635 and provides for the use of infeed belts which clamp the plants fast and convey them along a guide wall. An infeed wall is associated to each row of plants and rotating cutting disks cooperating either with stationary counter-knives or with equal-sized, frictionally overlapping and thus following cutting disks are arranged on the ends of the infeed wall in driving direction. The plants are transferred from the rear ends of the belts to the pre-pressing rolls of the harvesting machine. Holding of the plants in the infeed belt causes trouble if the stalks of the plants are of varying thickness. Transferring of the plants to the pre-pressing rolls is also done inaccurately, so that improper gripping of the plants will cause breakdowns or loss of plants in this case, as well.

In order to avoid the drawbacks of chain and belt infeeds, particularly because of the hazard of breakage of the chains or belts, attempts have been made to employ known, upright infeed rolls for two-row harvesting machines, such as they are described in Austrian Patent Specification No. 320 331. These implements are very elaborate, mainly due to the double provision of the pick-up apparatus and the optionally also doubly provided chopping means. Moreover, the considerably increasing expenditure makes it impractical to harvest more than two rows of crops simultaneously with this type of apparatus.

It is the object of the invention to avoid these disadvantages and to provide a pick-up apparatus which, at short and simple construction and under exclusive use of continuous pick-up organs, will harvest two or more rows of stalked plants, gather them to a stream and transfer them to the infeed means or conveying means of a harvesting machine, in particular a maize chopper. At the same time, mainly rotable construction elements are to be used and loops, belts or the like, which are essentially more fail-prone, are to be avoided.

This is achieved in an apparatus of the type initially mentioned by staggering the adjacent pick-up means in relation to one another in axial direction and by intermeshing them partly overlapping one another and by guiding the guide means of each pick-up means over an angle range of particularly at least 60 to 90°.

An advantageous arrangement of the pick-up wheels staggered in relation to one another in axial direction is achieved by providing for the axes of rotation of the pick-up wheel to be inclined in driving direction, which facilitates the picking up and lifting up of the crop.

It may be of advantage to provide the pick-up wheels along their axes with wheel disks of varying diameters, with the wheel disks of larger diameter positioned underneath when the plant stalks are introduced into the infeed means arranged behind at a wider angle in relation to the ground and the wheel disks positioned on top when the plant stalks are introduced at a steeper angle in relation to the ground.

It is of advantage when each pick-up wheel, in particular each pair of intermeshing pick-up wheels, is covered over a part of its surface by a dumping table preferably merging in driving direction in a projectingly tapering stalk or row divider covering the front face of the pick-up wheels. This provides a supporting surface for the plants and effects the division of the standing plant stalks in front of the pick-up wheels.

The drive is simplified by individually driving the pick-up wheels axially staggered in relation to one another by means of a low-positioned drive, preferably via identically rotating infeed organs of a rearwardly positioned infeed means of a harvesting machine.

For careful gripping of the plant stalks, it is practical to provide the pick-up wheels staggered in relation to one another in driving direction along their outer peripheries with radial tines or the like which are bent or angled counter to the rotating direction, with the associated projections, tines or the like of different wheel planes of each pick-up wheel preferably being arranged in axial direction one above the other.

As the thickness of the plant stalks to be harvested may strongly vary and all the plant stalks are to be held fast, it is favourable to provide, between adjacent wheel planes of the pick-up wheels staggered in relation to one another in driving direction, at least one each, optionally following, elastic, resilient clamping body, in particular hollow body, which essentially surrounds the axis of rotation and preferably extends into the range of the projections, tines or the like.

In order to avoid entraining of plants or plant parts by the pick-up wheel and a resulting entangling of the plants, stripping means are associated to the pick-up wheels, the stripping means extending into the central plane between pairs of intermeshing pick-up wheels and starting out from points positioned in driving direction in front of the axis of rotation and optionally within the circle of circumference of the roots of the tines or the like up to a point positioned behind the axis of rotation and within the circle of circumference of the tips of the tines or the like and between the adjacent wheel planes of each pick-up wheel.

For gathering the plants or adjacent rows, it is particularly advantageous to provide for the guide means of each pick-up wheel to be guided behind the plane of the axis of rotation of the pick-up wheel positioned essentially vertically in relation to the driving direction over a quarter at the most of the wheel circumference of the pick-up wheel and optionally extend in the direction of the infeed means of a harvesting machine.

In order to keep the harvested plants upright while conveying them to the conveying means positioned behind, the guide means of each pick-up wheel is arranged essentially vertically.

It has proven advantageous to form the guide means of each pick-up wheel as a closed surface, as this largely prevents jamming.

In order to combine a favourable diameter of the pick-up wheel with an advantageous adaptation to the prevailing distances between the rows, it is practical to guide the guide means from a point on the circumference of the pick-up wheel in front of the axial plane of the pick-up wheel positioned essentially vertically to the driving direction along the circumference of the pick-up wheel.

An improved introduction of the plant stalks between the projections, tines or the like of the pick-up wheels is achieved by providing the guide means with at least one elastic guide element in the circumferential range of the associated pick-up wheel, said elastic guide element at least partly crossing the circumferential range and at least partly extending counter to the driving direction.

To assure a simple construction, the guide means can have the form of a row- or stalk divider taperingly extending in driving direction.

A favourable cutting angle is achieved by providing for the cutting means associated to each pick-up wheel to consist of rotating knife- or cutting disks, with the knife disks which are preferably of larger diameter than the remaining cutting disks being arranged on the axis of rotation of the associated pick-up wheel.

It is of advantage to associate cutting disks of larger diameter within the range of the guide means to cutting disks of smaller diameter, said cutting disks of smaller diameter being rotatably positioned around an axis sta-

tionarily fixed to the apparatus body and overlapping, preferably engagingly, the cutting disk of larger diameter.

A particularly favourable embodiment of a cutting means which is of particular simplicity consists of a cutting knife fixed within the range of the guide means and having a cutting edge positioned obliquely in relation to the driving direction, said cutting means being slidable and lockable in driving direction, and at least one pressure stirrup at least partly overlapping the cutting range of the knife. This arrangement makes it possible to select the most favourable cutting position even at adjustable row width.

Depending upon the infeed means of the harvesting machine, it may be of advantage to arrange the adjacent pick-up wheels with their axes of rotation inclined toward one another, with their geometrical axes intersecting or crossing one another above or below the pick-up wheels. The position of the pick-up wheels, in particularly in relation to one another, essentially predetermines the position of the crop in conveying and in transfer, so that the selection of a suitable inclination of the stream of crop favourably influences the course of same, with good results in regard to throughput and mechanical efficiency.

For adjustment of the apparatus to various widths of the rows in which the crops are grown, it is of particular advantage to arrange each pick-up wheel together with the associated guide means and the associated cutting means spacially laterally and/or longitudinally adjustable in relation to the adjacent pick-up wheel and/or each associated guide means spacially adjustable and lockable in at least two positions in relation to the pick-up wheel.

For adjustment of the pick-up wheel to various row widths and/or stalk thicknesses, it is of advantage to provide for each pick-up wheel to be pivotable and lockable with its axis of rotation around a point of rotation which is positioned behind the axis of rotation in relation to the driving direction and preferably coincides with a next-lying, upright driving shaft, or around a point of rotation which is positioned in front of the axis of rotation in relation to the driving direction.

For better adaptation of the pick-up apparatus to different infeed means of harvesting machines, it is of advantage to arrange the adjacent pick-up wheels in front of a conveying means consisting of uprightly arranged pick-up drums and/or an endless belt rotating around upright axes of rotation and/or a conveyor screw arranged transversely to the driving direction.

For a proper transfer of the plant stalks from the pick-up wheels to the infeed means arranged behind or to the conveying means, it is of particular advantage when the adjacent pick-up wheels at least partly overlap with at least their projections, tines or the like, parts, preferably the intermeshing parts of uprightly arranged pick-up drums of the infeed means arranged behind.

When using the apparatus according to the invention in a maize harvesting machine with essentially vertical infeed rolls, it is of advantage that the axial extension of the adjacent pick-up wheels be less than the axial height of the pick-up drum or the infeed rolls together with the cover of the conveying means arranged behind, so as to form a dumping table.

The invention is described in the following by means of various embodiments under reference to the accompanying drawings.

Figure 1 shows a partly sectional, partly diagrammatic side elevation of the embodiment according to the invention of the apparatus;

Figure 2 is a plan view of the apparatus according to Fig. 1;

Figure 3 a slightly modified embodiment of the apparatus according to the invention in enlarged scale in section through the common wheel axis plane along line III–III in Fig. 4;

Figure 4 a section along line IV–IV in Fig. 3;

Figure 5 a different embodiment of the apparatus according to the invention diagrammatically in side elevation, partly in section;

Figure 6 the embodiment according to Fig. 5 in plan view and partly in section;

Figure 7 a further embodiment of the apparatus according to the invention in elevational side view;

Figure 8 the embodiment according to Fig. 7 in plan view and partly in section;

Figure 9 another embodiment of the apparatus according to the invention in side elevation, partly in section and

Figures 10 and 11 two embodiments of the apparatus according to the invention with further conveying elements in plan view.

Fig. 1 and 2 show an apparatus according to the invention attached to the front face of a maize chopper. The apparatus is provided with two pick-up wheels 1, 2 driven in opposite directions and intermeshing and overlapping one another, having tines 10 bent counter to the rotating direction, the respective associated guide means 3, 4 and the cutting means 8, 9 associated to each pick-up wheel 1, 2; the drive is effected by means of a chain drive from below, from the infeed means of the maize chopper. The pick-up wheels are cased in by a cover which merges in driving direction F into a central stalk divider 17. The guide means 3, 4 is formed as part of the respective stalk divider 28, 28'. The pick-up wheels 1, 2 are positioned rotatably around axes of rotation 11, 12 which are parallel in relation to one another and inclined in the driving direction F and provided with three each wheel disks 13, 14, 15 consisting of the tines 10 and attached to the pick-up wheel

shaft, with a following cutting disk 29, 29' attached below the wheel disks in the range between pick-up wheel 1, 2 and guide means 3, 4, said cutting disk cooperating with a further cutting disk 30, 30' rotatably positioned within the range of the associated guide means 3, 4 around an axis parallel to the axis of the pick-up wheel and made to follow by means of frictional engagement with the cutting disk 29, 29'. For this purpose, the cutting disks 30, 30' are pressed by means of pressure springs against the cutting disks 29, 29'. The axis of rotation of the cutting disks 29, 29', 30, 30' are all positioned in one plane A–A.

The guide means 3, 4 is guided along a small part, preferably about one sixth to one quarter, of the circumference of each pick-up wheel counting from axis A on, with a slight distance 7 remaining between the circumference 5, 6 of the pick-up wheel 1, 2 and the guide means 3, 4. The guide means 3, 4 is provided with a vertical wall extending in driving direction. Rearward, the guide means 3, 4 extends up to the immediate range of the infeed means of the maize chopper.

In the embodiment according to Fig. 3 and 4, the pick-up wheels 1, 2 driven in opposite directions are provided with tines 10 extending in radial direction and bent back on their ends counter to the rotating direction X and Y, respectively, with associated tines of various wheel levels or wheel disks arranged in axial direction precisely one above the other, i.e. aligned. In this embodiment, two wheel disks 44, 44', 45, 45' are arranged one above the other, between them stripping means 22, 22', 23, 23' are attached and extending from the points of attachment 24, 24' in front of the pick-up wheels 1, 2 up to a point of attachment 25 positioned in the central plane XI between the pick-up wheels 1, 2 and behind these in driving direction F.

The associated guide means 3, 4 is guided from a range 26, 26' in front of the plane of the wheel axis along the pick-up wheels 1, 2 and ends in the immediate range of the pick-up drums 37, 37' of the conveying means of the pick-up apparatus or the infeed means of the maize chopper. The pick-up drums are positioned with their axes of rotation as parallel as possible in relation to those of the pick-up wheels 1, 2, as this simplifies the drive via the chain drive 18 (Fig. 1) from the obliquely opposite pick-up drums. The pick-up drums 37, 37' are provided over a portion of their extension in radial direction with intermeshing or overlapping elements 40 which are overlapped by the tines 10 of the respective associated pick-up wheel 1, 2, which allows for a particularly firm gripping of the plant stalks.

An elastic guide element 27, 27' extends from a point or a spot 26, 26' on the guide means 3, 4 rearward in driving direction and tapers backwards crossing the operational range of the tines 10. The large cutting disks 29, 29' of the cutting means, which are of approximately the diameter of the tine circles 10 of the pick-up wheels 1, 2, engage the smaller cutting disks 30, 30', the smaller cutting disks 30, 30' being pressed against the larger cutting disks 29, 29' by means of spring force (Fig. 3).

Adjustment of the row width can be achieved by pivoting the pick-up wheels 1, 2 together with the guide means 3, 4 and the cutting means 8, 9 around the respective, closest-lying axes of rotation 33, 33' of the pick-up drums 37, 37' arranged behind or around the axes of rotation 33, 33' of the obliquely opposite pick-up drums 37, 37', in which case the effective chain length can be changed by means of a known chain tension adjuster not shown.

A further possibility for adjustment consists in forming the pick-upwheels 1, 2 pivotable in relation to one another around a point positioned in front of the axes of rotation 11, 12, for instance 35 (Fig. 4).

Fig. 5 and 6 show a further embodiment in which the pick-up wheels 1, 2 are provided with coaxial wheel disks 13, 14, 15 which are arranged one above the other in relation to the axis of rotation 11, 12 and whose diameter increases from the top to the bottom, so that plant stalks of strongly inclined position can be introduced into the infeed means of a maize chopper arranged behind. The associated guide means 3, 4 is situated in this case within the range of the circumference 5, 6 of the respective pick-up wheel 1, 2 at approximately equal distance 7. (Fig. 5).

A further embodiment of the invention is represented in Fig. 7 and 8; this embodiment differs from the one previously described in that elastic clamping bodies 21, 21' resulting in a firm gripping of the plant stalks of different thickness are provided between adjacent wheel disks 44, 44', 45, 45' of the pick-up wheels 1, 2. In this embodiment, the cutting means 8, 9 is also of different construction and consists of cutting knives 31, 31' ridigly attached between guide means 3, 4 and pick-up wheels 1, 2 and cooperating with cutting disks 29, 29', the cutting edges 53, 53' of the cutting knives 31, 31' being arranged obliquely in relation to the driving direction F and their cutting range being partly overlapped by one each pressure stirrup 32, 32'. The cutting knives 31, 31' are further provided with elongated holes which are penetrated by screws or the like 54 by means of which the cutting knives 31, 31' are attached to a bracket in the guide means 3, 4. Due to the provision of the elongated holes, the cutting knife 31, 31' is slidable and lockable within a range in driving direction F. The guide means 3, 4 is positioned close to the infeed means of a maize chopper so that

the pre-pressing rolls 41, which are rotatably positioned around axes of rotation of essentially horizontal situation, come tightly against the periphery 5, 6 of the pick-up wheels 1, 2.

The arrangement of the pick-up wheels 1, 2 which is shown in Fig. 9, with the geometrical axes 11, 12 of the wheels intersecting above same, allows the lifting up of the plant stalks and their conveying to an infeed means positioned at a higher level. The cutting disks 29, 29' or their associated cutting knives 30, 30' retain their position in this, while the pick-up wheels 1, 2 rotate either towards each other or away from each other, depending upon the position of their axes, which is made possible by means of universal couplings 11', 12'.

Fig. 10 and 11 show embodiments having conveying means consisting for instance of a transverse conveyor belt 38 (Fig. 10) or a transverse conveyor screw 39 (Fig. 11) and being arranged at a slight distance behind the pick-up wheels 1, 2. In this case, the drive of the pick-up wheels 1, 2 is tapped from the conveyor means. These figures also show, in a general manner, the adjustability of the row width which is achieved by forming the pick-up wheels 1, 2 together with their guide means 3, 4 and their cutting means 8, 9 or at least part thereof laterally slidable or pivotable. The row dividers between pairs of intermeshing pick-up wheels 1, 2, 1', 2' are also provided divided in this case.

The invention is not limited in its application to maize choppers having vertical or horizontal infeed means or pre-pressing rolls or to maize picking implements, but can also be used for any other, similar type of agricultural implement.

The invention is not limited to the disclosure of the specification and/or the claims, within the scope and without departing from the spirit of the invention, changes and modifications are possible.

CLAIMS

1. An apparatus for picking up, cutting off and conveying stalked crops grown in a plurality of rows, to the infeed means of a harvesting machine the apparatus comprising two driven pick-up wheels of upright axes of rotation arranged side by side in driving direction and provided on their peripheries with projections, with one guide means and one cutting means associated to each pick-up wheel, said guide means being guided along a part of the periphery of the pick-up wheel at a distance which is small as compared to the diameter of the pick-up wheel and each guide means being provided with an associated cutting means in the range betwen guide means and pick-up wheel swept by the projections, wherein the adjacent pick-up wheels are staggered in relation to one another in axial direction and intermesh partly over-lapping one another and that the guide means of each pick-up wheel is guided over an angle range of 60° to 90°.

2. An apparatus according to claim 1, wherein the pick-up wheels staggered in relation to one another in axial direction are inclined with their axes of rotation in driving direction.

3. An apparatus according to claim 1 or 2, wherein the pick-up wheels are provided with wheel disks of varying diameters along their axes, the wheel disks of larger diameter being positioned underneath when the plant stalks are introduced into the infeed means arranged behind at a wider angle in relation to the ground and the wheel disks positioned on top when the plant stalks are introduced at a steeper angle in relation to the ground.

4. An apparatus according to any one of the claims 1 to 3, wherein the pick-up wheels staggered in relation to one another in driving direction are individually driven by means of a low-positioned drive, preferably via identically rotating infeed organs of a rearwardly positioned infeed means of a harvesting machine.

5. An apparatus according to any one of the claims 1 to 4, wherein the pick-up wheels staggered in relation to one another in driving direction are provided on their outer peripheries with radial tines or the like bent or angled counter to the rotating direction, with the projections, tines or the like of different wheel planes of each pick-up wheel preferably being arranged in axial direction one above the other.

6. An apparatus according to claim 5, wherein between adjacent wheel planes of the pick-up wheels staggered in relation to one another in driving direction, at least one each, optionally following, clamping body, in particular hollow body, per pick-up wheel is arranged, said body being elastic and resilient and essentially surrounding the axis of rotation and preferably extending into the range of the projections, tines or the like.

7. An apparatus according to any one of the claims 1 to 6, wherein stripping means are associated to the pick-up wheels, said stripping means extending into the central plane between pairs of intermeshing pick-up wheels and starting out from points positioned in driving direction in front of the axis of rotation and optionally within the circle of circumference of the roots of the tines or the like up to a point positioned behind the axis of rotation and within the range of the circle of circumference of the tips of the tines or the like and between the adjacent wheel planes of each pick-up wheel.

8. An apparatus according to any one of the claims 1 to 7, wherein the guide means is situated behind the plane of the axis of rotation of the pick-up wheel positioned essentially vertically in relation to the driving direction over a quarter at the most of the wheel circumference of the pick-up wheel and is

optionally extended in the direction of the rearwardly positioned infeed means of a harvesting machine.

9. An apparatus according to any one of the claims 1 to 8, wherein the guide means is provided with at least one elastic guide element in the circumferential range of the associated pick-up wheel, said elastic element at least partly crossing the circumferential range and at least partly extending counter to the driving direction.

10. An apparatus according to any one of the claims 1 to 9, wherein the adjacent pick-up wheels are arranged with their axes of rotation inclined toward one another, with their geometrical axes intersecting or crossing one another above or below the pick-up means.

11. An apparatus according to any one of the claims 1 to 10, wherein the adjacent pick-up wheels together with said guide means and said cutting means are spacially laterally and/or longitudinally adjustable in relation to the adjacent pick-up wheel and/or each associated guide means is spacially adjustable and lockable in at least two positions in relation to the pick-up wheels.

12. An apparatus according to any one of the claims 1 to 11, wherein the adjacent pick-up wheels are pivotable and lockable with their axes of rotation around points of rotation which are positioned behind the axes of rotation in relation to the driving direction and preferably coincide with next-lying, upright driving shafts.

13. An apparatus according to any one of claims 1 to 12, wherein the adjacent pick-up wheels are arranged in front of a conveying means respectively consisting of uprightly arranged pick-up drums and/or an endless belt rotating around upright axes of rotation and/or a conveyor screw arranged transversely to the driving direction.

14. An apparatus according to any one of the claims 1 to 13, wherein the adjacent pick-up wheels at least partly overlap at least with their projections, tines or the like, parts, preferably the intermeshing parts of uprightly arranged pick-up drums of the rearwardly arranged infeed means.

15. An apparatus according to any one of the claims 1 to 14, wherein the adjacent pick-up wheels are of an axial extension which is less than the corresponding axial height of the pick-up drum or of the infeed rolls together with the cover of the rearwardly arranged conveying means.

16. An apparatus according to any one of the claims 1 to 15, wherein the adjacent pick-up wheels are provided with a cutting means consisting of rotating cutting disks, with cutting disks of larger diameter being arranged on the axes of rotation of said pick-up means and cutting disks of smaller diameter being arranged within the range of the guide means and positioned rotatably around a stationary axis on the apparatus body and engagingly overlapping the cutting disk of larger diameter.

17. An apparatus according to any one of the claims 1 to 16, wherein the adjacent pick-up wheels are provided with a cutting means consisting of a cutting knife fixed within the range of the guide means and having a cutting edge positioned obliquely in relation to the driving direction, with at least one pressure stirrup at least partly overlapping the cutting range of the knife being associated to the knife.

18. An apparatus as hereinbefore described with reference to the accompanying drawings.

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